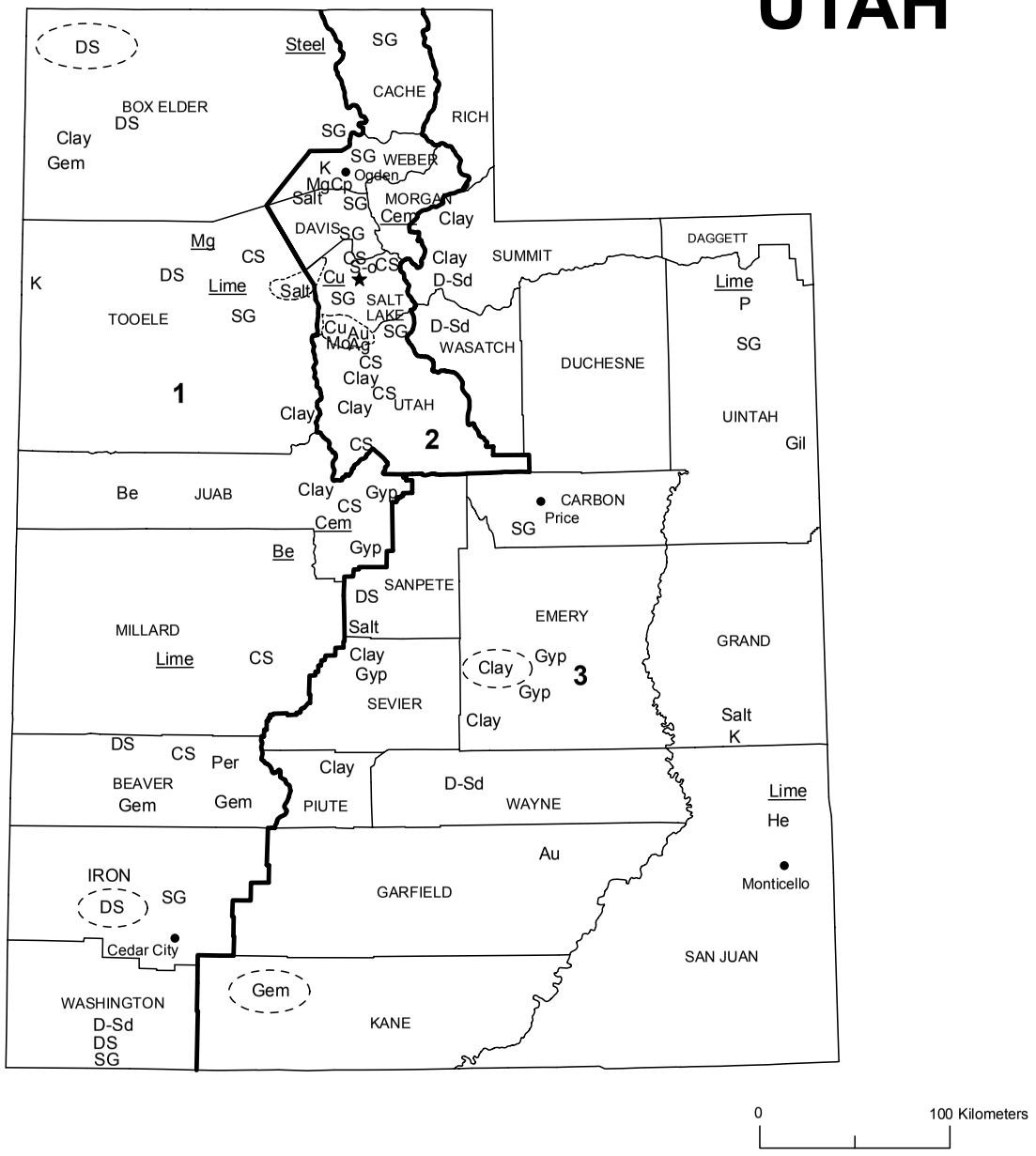
UTAH



LEGEND

- County boundary
- ★ Capital
- ● City
- 1 — Crushed stone/sand and gravel districts

MINERAL SYMBOLS
(Major producing areas)

Ag	Silver
Au	Gold
Be	Beryllium
Be	Beryllium plant
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
Cu	Copper
Cu	Copper plant
D-Sd	Dimension sandstone
DS	Dimension stone
Gem	Gemstones
Gil	Gilsonite
Gyp	Gypsum
He	Helium
K	Potash
Lime	Lime plant
Mg	Magnesium metal plant
MgCp	Magnesium compounds
Mo	Molybdenum
P	Phosphate rock
Per	Perlite
S-o	Sulfur (oil)
Salt	Salt
SG	Construction sand and gravel
Steel	Steel plant
⬭	Concentration of mineral operations

Source: Utah Geological Survey/U.S. Geological Survey (2003)

THE MINERAL INDUSTRY OF UTAH

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Utah Geological Survey for collecting information on all nonfuel minerals.

In 2003, the estimated value[1] of nonfuel raw mineral production for Utah was $1.26 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was an increase of about 2% compared with that of 2002[2] and followed an 8.8% decrease from 2001 to 2002. The State rose to 9th from 11th in rank among the 50 States in total nonfuel mineral production value, of which Utah accounted for more than 3% of the U.S. total.

Metals accounted for about 59% of Utah's nonfuel mineral production value, and copper accounted for more than 60% of the State's entire metal value. In 2003, the most significant changes were in the metals sector; the production of copper, magnesium metal, and magnesium compounds increased and their values rose by an estimated $90 million, $17 million, and about $10 million, respectively. The production of gold decreased, and its value dropped to about $30 million (table 1).

In 2002, the production of magnesium metal increased, and its value rose by about $22 million; the value of potash rose by about $10 million. Smaller yet significant increases in the production and values of—in descending order of change—phosphate rock and magnesium compounds were more than offset by decreases in the production and values of copper, the value of which was down by more than $90 million; gold, down by about $50 million; salt, down by $8 million; and construction sand and gravel, down by $5 million. These changes resulted in a net decrease in the total value of these metals for the State for the year. Other decreases of smaller, yet significant, magnitude also were found for, in descending order of change, silver, crushed stone, portland cement, gemstones, and common clays (table 1).

Based upon USGS estimates of quantities produced in the 50 States during 2003, Utah remained the only State to produce, in descending order of value, magnesium metal and beryllium concentrates. It ranked second in the production of copper, magnesium compounds, and potash; third in gold and molybdenum concentrates; fourth in phosphate rock and silver; and sixth in salt. The State increased to third from fourth in the production of perlite and also was a significant producer of common clays, construction sand and gravel, gemstones, lime, and portland cement.

The Utah Geological Survey[3] (UGS) provided the following narrative information. UGS production data were based upon its surveys, estimates, and information gathered from company annual reports. These data may differ from some USGS preliminary estimates and final production figures, which were based upon USGS company surveys and estimates.

Exploration and Development Activities

During 2003, the Utah Division of Oil, Gas and Mining (DOGM) received 5 large mine permit applications [2 hectares (ha) and larger disturbance] and 21 new small mine permit applications (less than 2 ha disturbance). The five large mine permit applications, which were all for industrial minerals, included three new mine applications and two applications to change from a small mine permit to a large mine permit. All of the small mine permits were for new operations. Of the 21 small mine permits, 6 were for dimension stone, 4 for limestone, 3 for precious metals, 3 for clays, 2 for crushed stone, 2 for gemstones, and 1 for gypsum.

Mineral exploration increased statewide in 2003. DOGM received 21 new notices of intent (NOIs) to explore on public lands, of which 14 were approved. The number of applications was higher than for the past several years; 11 were filed in 2002, 14 in 2001, and 15 in 2000. The 21 NOIs by county included: Beaver, 5; Box Elder, 1; Iron, 2; Juab, 2; Millard, 2; Tooele, 6; Uintah, 1; and Utah, 2. Of the 21 applications, 9 were for industrial minerals, 8 for precious metals, and 2 for base metals; the remaining 2 were for a seismic research project and for road building. Half of the precious metals NOIs were from individuals, and most were for areas unlikely to have any gold. The remaining precious metal NOIs were from companies and were either for existing mining districts or areas where previous drilling found some mineralization. The major base and precious metal exploration and development areas are discussed below.

Clays.—In the Tintic district, Atlas Mining Co. of Osborn, ID, began exploration and development work on its Dragon halloysite property, which was approximately 4.8 kilometers (km) due south of Eureka in Juab County. Work consisted of limited drilling to confirm and verify reserves, partial rehabilitation of the 137-meter (m)-deep main shaft, and milling and processing tests. Much effort

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[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2003 USGS mineral production data published in this chapter are preliminary estimates as of July 2004 and are expected to change. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2002 may differ from the Minerals Yearbook, Area Reports: Domestic 2002, Volume II, owing to the revision of preliminary 2002 to final 2002 data. Data for 2003 are preliminary and are expected to change; related rankings also may change.

[3]Robert Gloyn [deceased], Senior Geologist, and Roger Bon, Industry Outreach Specialist, at the Utah Geological Survey authored the text of the State mineral industry information provided by that State agency.

was directed toward establishing new markets and uses other than the standard high-quality ceramic use. Of particular interest was development of microtubular applications, particularly for timed release of components that use natural halloysite tubes. The company was scheduled to begin production in mid-2004. Current reserves were estimated to be 272,000 metric tons (t) of high-quality halloysite with an estimated value of $496 per metric ton. The company predicted a market demand of 5,400 to 13,600 metric tons per year (t/yr) of halloysite.

Copper.—During 2003, Kennecott Utah Copper concentrated on in-fill drilling in the pit and extensive engineering drilling (RQD drilling[4]) for pit planning and design to minimize overburden removal. No formal decision was announced on the future of underground mining. Options that were under consideration included continuation of the open-pit mine plan, expansion of the open pit ("Great Leap pit"), initiation of underground block caving, initiation of underground skarn mining, or any combination of the above. A decision was expected at the end of 2004. The pit plan would allow mining until 2014, and the expanded pit, not currently approved, would provide ore through 2024. Some of the ore resources included in the underground block-cave or underground skarn category could be mined in the Great Leap pit.

Constellation Copper Corp. proceeded with development of its Lisbon Valley Copper project. The company planned to begin facilities construction in 2004, with full production anticipated by mid-2005. A completed technical update to the original feasibility study indicated total life-of-mine costs (which included capital and reclamation costs) of $0.69 per pound ($1,521 per metric ton). The proven and probable reserves for the Sentinel, Centennial, and GTO pits were 33.3 million metric tons (Mt) grading 0.51% copper. The operation was fully permitted, except for a State air quality permit, which was pending.

In late 2003, Constellation acquired additional leases southeast of the GTO deposit that covered a portion of the deep, high-grade GTO Extension deposit. In December 2003, the company began a 25-hole drilling program to test this deposit further. Drilling indicated an average mineralized thickness of 6.48 m at a grade of 3.25% copper, at depths of 107 to 141 m. Previous drilling outlined a resource of approximately 900,000 t grading 1.9% copper. This resource was amenable to underground mining. A geologic report on the Lisbon Valley copper deposit was available online at Constellation's Web site (Hahn and Thorson, 2003§[5]).

During 2003, Western Utah Copper Co. (WUCC) continued its activities in Beaver County to secure and add to its large exploration and development land position within the east-west-trending Milford mineral belt and elsewhere in Beaver County. In November 2003, WUCC completed its purchase of the Beaver County assets of Nevada Star Resource Corp., which included most of the known copper deposits and prospective ground in the Rocky Range and Beaver Lake mining districts. In late November, WUCC entered into an agreement with Palladon Ventures Ltd. that granted Palladon an option to bring certain deposits into production and the right to fund a multi-million-dollar exploration program on WUCC's non-reserve lands within the belt. Since entering into their agreement, Palladon and WUCC had analyzed data and drill targets and planned to begin drilling on several targets in mid-2004. At the end of 2003, WUCC's land position in the Milford mineral belt totaled about 206 square kilometers (km^2).

Gold and Silver.—The WUCC also acquired properties north and south of the Milford mineral belt that had potential for gold deposits. Properties included the Golden Reef zone north of the belt and the Goldfinger trend south of the belt in the Blue Mountain area. WUCC began a drilling program in the Goldfinger trend in January 2004 and early drill results were encouraging. Additional drilling was planned for both this and other areas.

Grand Central Silver Mines Inc. announced the discovery of several southwest-trending mineralized fault or breccia zones on its Southwest Bingham Canyon property based on extensive surface and underground sampling. The company reported the discovery of four surface gold zones and three underground gold zones, but had released no details as of May 2004 as to the width, lateral extent, or precious and base metal grades of the zones. The location of the property suggested that it was near the outer limit of the lead-zinc zone and within a postulated arsenic-gold zone.

Dumont Nickel Inc., through its wholly owned Utah subsidiary Dumont Mining, continued property acquisition and exploration on its joint-venture properties in the Clifton-Gold Hill area of westernmost Tooele County. During 2003, Dumont staked nearly 600 mining claims, optioned an additional 82 claims that included the Kiewit gold-adularia-bearing altered zone, and leased four State sections around and between the claims previously optioned from Clifton Mining Co. and Woodman Mining Co. By early 2004, the company's property position was approximately 85 km^2.

Exploration by Dumont during 2003 was designed to confirm, upgrade, and expand previous exploration results on the properties. Exploration included reconnaissance mapping and sampling of the Cane Springs property and surrounding areas to include two large jasperoid/jasperoid-breccia bodies, and drilling of three vertical holes that totaled 366 m to test the southeast extension of the mineralized shear zone. The drilling intersected four shear zones that had mineralized thicknesses of 1 to 5 m and contained 0.2 to 5.8 grams per metric ton (g/t) gold with associated copper. Dumont verified sampling of the Clifton Shears, which was a 0.8-km-wide by 2.4-km-long northeast-trending zone with over 40 shear zones that contained gold, lead, silver, and zinc values, and initiated a core drilling program to test the depth potential of several of the shear zones. More than 270 underground and surface samples were collected; they confirmed previous sampling results. Samples had gold grades of up to 16.8 g/t over widths of 0.15 to 15.2 m. Seven angle holes that totaled 1,280 m were drilled in December 2003 and January 2004 and confirmed that the shears continue to a depth of at least 213 m; assay results from this drilling, however, were not released. Dumont collected 300 soil samples from several zones of silicification that covered an area of 4 km^2 in the IBA property in the southwestern part of the district. A large anomalous gold-silver

[4]RQD refers to Rock Quality Designation. MiningLife Media, Vancouver, British Columbia., Canada, defines RQD as the cumulative length of core pieces longer than 10 centimeters in a run divided by the total length of the core run.

[5]A reference that includes a section mark (§) is found in the Internet Reference Cited section.

zone was discovered and was found to be still open to the north. The company performed limited surface sampling of the gold- and beryllium-bearing Kiewit altered zone that confirmed significant gold values.

Unico, Inc. continued exploration on its Bromide Basin gold properties in Garfield County. In 2003, the company partially dewatered the Bromide tunnel to access several of the fault-intersection breccias along the vein and took selected bulk samples of the breccias. The company continued to drive the El Padre tunnel to intersect the Bromide vein approximately 122 m below the Bromide mine adit level, mapped and sampled parts of the Kimble and Turner Mine, and began screen-testing of the Kimball-Turner stockpile.

Unico mined a small amount of ore in 2003 from its Deer Trail property in Piute County, which is south of Marysvale. During the early part of the year, Unico began mining the high-grade mantos in the 3400 East ore body, but mining was curtailed until the mill circuits were upgraded to produce a cleaner, more salable concentrate. In mid-2003, Unico began to sample and evaluate the dumps and tailings from the oxidized gold-rich Upper (old) Deer Trail adit. The Upper Deer Trail adit dumps contained approximately 22,700 to 27,200 t of material. Based on a 907 t composite sample, these dumps averaged 5.1 g/t gold and 171 g/t silver. The property also contained 167,000 t of mill tailings that averaged 1.4 g/t gold and 103 g/t silver. The company hoped to process up to 4500 t or more of dump material per year once the mill rehabilitation was completed.

North American Gold, Inc. drilled six holes that totaled 971 m in two areas in the Gold Springs district, which is a low-sulfidation epithermal gold-silver district that straddles the Utah-Nevada line in western Iron County. The holes were angled and designed to intersect the quartz-adularia veins and any adjacent stockwork or lower-grade wall-rock mineralization. Although drilling did intersect several gold veins that contained from 1.0 to 3.4 g/t gold, the results did not justify holding the property and it was returned to the vendor.

Commodity Review

In 2002, DOGM recorded production from 68 large mines (excluding sand and gravel and coal), which was one fewer than in 2001. The large mines included 4 base metal mines, 4 precious metal mines, and 60 industrial-mineral mines (including fossils, gemstones, geodes, and others). Ninety-four small mines reported production in 2002, which was 16 fewer than in 2001. These small mines included 60 industrial minerals, 9 precious metals, and 25 gemstone, fossil, geode, and other operations. Complete statistics for 2003 were not available because many operators did not file their annual reports until yearend 2004.

Industrial Minerals

Industrial-minerals production, which had an estimated value of $555 million, was the second-largest contributor to the value of minerals produced statewide in 2003. Within the past 5 years, those commodities or commodity groups that realized substantial gains included crushed stone and sand and gravel; lime and portland cement; and salines, including magnesium chloride, potash (potassium chloride), salt, and sulfate of potash (SOP). Other major commodities produced in Utah included, in descending order of value, phosphate, gilsonite, expanded shale, common clay, bentonite, and gypsum.

Bentonite and Clays.—Nearly 194,000 t of common clay and approximately 61,000 t of bentonite were produced by five companies in 2003, which was a 20% decrease in the amount of common clay produced and a 90% increase in bentonite compared with 2002. In descending order of production, the three largest producers of common clay in 2003 were Interstate Brick Co., Interpace Industries, and Paradise Management Co. More than 75% of all common clay was used in the manufacture of brick. Two companies (Western Clay Co. and Redmond Minerals, Inc.) mined bentonite from pits in central Utah, mostly for use as an additive to oil and gas drilling fluids, a binder in foundry molds, a pet-waste absorbent (litter-box filler), and a sealant. ECDC Environmental, LLC intermittently produced clay for use at its waste disposal facility near the town of East Carbon in Carbon County. Sufficient stockpiled material precluded any additional clay mining by ECDC in the foreseeable future.

Crushed Stone and Sand and Gravel.—Sand and gravel and crushed stone (including limestone and dolomite) were the third-highest contributors to the value of industrial minerals produced in Utah during 2003 (down from the highest in 2002); these commodities had an estimated value of $140 million, which was about $2.1 million (less than 2%) less than in 2002 (Tepordei and Bolen, 2004). These materials were produced in nearly every county in Utah by commercial operators and by Federal, State, and county agencies. Preliminary 2003 data compiled by the USGS showed production of 26.5 Mt of sand and gravel, which had an estimated value of $101 million, and 8 Mt of crushed stone, which had an estimated value of $40 million. In comparison, 2002 values were 27.6 Mt of sand and gravel and 7.64 Mt of crushed stone (Tepordei and Bolen, 2004).

Ten to twelve operators quarried about 1.3 Mt of limestone and dolomite in 2003 that was used mainly for construction and flue-gas desulfurization in coal-fired powerplants. A small amount of limestone and dolomite also was crushed to a fine powder and marketed as rock dust to the coal mining industry. The three largest suppliers of crushed limestone used for construction were Staker and Parsons Co. (which had two quarries in Utah County) Harper Construction Co. (which had one quarry in Salt Lake County), and Pelican Point Rock Products Co. (which had one quarry in Utah County).

Gilsonite.—Gilsonite production for 2003 was estimated to be about 52,000 t, which was about 7,300 t less than in 2002. All of the gilsonite mines were in southeastern Uintah County. The three companies that produced gilsonite were, in descending order of production, American Gilsonite Co., Zeigler Chemical and Minerals Co., and Lexco, Inc.

Gypsum.—Four companies produced about 349,000 t of gypsum in 2003, which was nearly 32,000 t more than in 2002. In descending order of production, the companies were U.S. Gypsum Co., H.E. Davis and Sons, Nephi Gypsum, Inc., and D.K. Gypsum Industries. U.S. Gypsum operated the only active wallboard plant in Utah. The plant was near the town of Sigurd in Sevier County. The Georgia-Pacific Corp. plant, which was also near Sigurd, closed in 2002 and the company's mines in Utah were inactive.

Georgia-Pacific shifted wallboard manufacturing to the company's Las Vegas, NV, facility. Most gypsum produced in Utah was used for making wallboard, but several operators supplied raw gypsum to regional cement companies, where it was used as an additive to retard the setting time of cement, and to the agricultural industry for use as a soil conditioner.

Lime and Portland Cement.—Portland cement and lime were the highest value industrial minerals produced in 2003, with a combined value of $167 million, which was about $8 million (5%) less than in 2002. Two operators produced portland cement in Utah: Holcim, Inc. and Ash Grove Cement Co. Holcim's Devils Slide and plant and associated quarries were east of Morgan in Morgan County, and Ash Grove's Leamington plant and quarries were east of Lynndyl in Juab County. The companies had a combined capacity of more than 1.4 million metric tons per year of cement. Both plants operated at or above capacity in 2003, and, according to the UGS, produced a total of nearly 1.5 Mt. In addition to limestone, both Holcim and Ash Grove Cement mined modest amounts of shale and sandstone that were used as supplementary raw materials in the manufacture of cement.

Lime production was about 6% higher in 2003 than in 2002. The UGS estimated that production was about 590,000 t. There were two suppliers of lime in Utah, with a combined capacity of more than 900,000+ t/yr: Graymont Western U.S., Inc. (formerly Continental Lime Co.), which was 56 km southwest of Delta in Millard County and produced dolomitic quick lime and high-calcium quick lime; and Chemical Lime of Arizona, Inc., which was 13 km northwest of Grantsville in Tooele County and produced dolomitic quick lime and hydrated lime. Both operations served markets in Utah and surrounding States.

Perlite.—Two companies produced lightweight expanded products from shale and perlite for use primarily in the construction and building industries. Utelite, Inc., which was in Summit County, mined nearly 159,000 t of shale in 2003 to manufacture expanded shale for use as a lightweight aggregate for the construction industry. Production of expanded shale was approximately 12% lower in 2003 than in 2002. Basin Perlite Co., which was in Millard County, mined about 36,000 t of perlite ore to produce expanded perlite for use mainly in the manufacture of building construction products.

Phosphate.—Simplot Phosphates LLC (formerly SF Phosphates, Ltd.) produced about 3.4 Mt of ore in 2003, which was about 7% less than that produced in 2002. The mine was 18 km north of Vernal in Uintah County. SF Phosphates was originally a partnership of Farmland Industries, Inc. and J.R. Simplot Co., but in 2003, it was wholly owned by J.R. Simplot. The phosphate ore was processed into concentrate that was transported in slurry form to the company's Rock Springs, WY, fertilizer plant by way of a 145-km-long underground pipeline.

Salt and Other Brine-Derived Products (Magnesium Chloride and Potash).—Brine-derived products, which included salt, were the second-highest contributors (up from third-highest in 2002) to the value of industrial-minerals production in Utah during 2003; they had a combined value of about $155 million, which was about $6.9 million (4.7%) greater than in 2002. The statewide production of salt and other brine-derived products, excluding magnesium metal, was estimated to be 3.38 Mt in 2003, which was about 36,000 t higher than in 2002. Potash production, including sulfate of potash (SOP), was estimated to be about 360,000 t in 2003, which was approximately 40,000 t more than in 2002. In addition to salt, brine-derived products included magnesium chloride and potash (potassium chloride and SOP). One company (North Shore Limited Partnership) produced a small amount of concentrated brine that was used as an ingredient in mineral food supplements.

Salt production alone was estimated to be 2.5 Mt in 2003, which was about 227,000 t less than in 2002, with most of the production coming from three operators that processed brine from the Great Salt Lake. These operators were, in descending order of production, Great Salt Lake Minerals Corp., Morton International Inc., and Cargill Salt Co. In addition, three other companies produced salt and/or potash from operations that were not on Great Salt Lake; they were Moab Salt, LLC, which was near Moab in Grand County (salt and potash); Redmond Minerals, Inc., which was near Redmond in Sanpete County (salt); and Reilly Chemical Co. at Wendover, which was in Tooele County (salt and potash).

Metals

Base-metal production, which had an estimated value of $690 million, was the largest contributor to the value of minerals produced in Utah in 2003. Those metals were, in descending order of value, copper, magnesium metal, molybdenum, and beryllium. The 2003 base-metal value was about $78 million (13%) greater than that of 2002. Kennecott Utah Copper Corp.'s Bingham Canyon Mine, which was southwest of Salt Lake City, was the State's sole producer of copper and molybdenum and its major producer of gold and silver. The combined value of minerals produced from the Bingham Canyon Mine was more than one-third of the total value of all minerals produced statewide.

Beryllium.—Utah continued to be the nation's sole producer of beryllium concentrates. Beryllium ore (bertrandite) was mined at Brush Resource's Topaz and Hogs Back Mines in Juab County and processed along with imported beryl at the company's plant a few kilometers north of Delta in Millard County. The product (beryllium hydroxide) was then sent to the company-owned refinery and finishing plant in Ohio, where it was converted into beryllium metal, alloys, and oxide. In 2003, about 43,000 t of ore was mined and trucked to the processing plant. The mine produced substantially more ore than in previous years owing to increased demand.

Copper.—Copper was the largest contributor to the value of nonfuel minerals in Utah. Copper production from Kennecott's Bingham Canyon Mine increased moderately in 2003 to approximately 280,000 t compared with production of approximately 260,000 t of copper metal in 2002. Published open-pit reserves that remained at the end of 2003 were sufficient for 12 years at current production rates (Rio Tinto, 2004). The increase in dollar value of copper produced was also helped by an increase in the price of copper to over $2.20 per kilogram (kg) ($1.00 per pound) at yearend.

Gold and Silver.—Precious metal production in 2003, which comprised gold (88% of total value) and silver (12% of total value), had an estimated value of $136 million, which was a decrease of $36 million compared with that of 2002. Gold production in 2003

was estimated to be more than 9,300 kg, which was a 25% decrease from the 12,400 kg produced in 2002. Gold was produced by one primary producer (Barneys Canyon Mine) and by one byproduct operation (Bingham Canyon Mine) from two surface mines in Salt Lake County that were owned by Kennecott Corp. Several other small mines in the State produced minor amounts of gold and silver, but metal-specific production was not reported, and was not included in the above totals. The Barneys Canyon Mine, which ceased mining in late 2001, was expected to continue to produce gold from its heap-leach pads at a much-reduced rate into 2005. The reduced gold production statewide was due to a combination of lower gold-content copper ore and lower smelter throughput at the Bingham Canyon operation. Silver production was estimated to be approximately 109,000 kg in 2003, which was about 3,100 kg less than that produced in 2002. Silver was produced as a byproduct metal from the Bingham Canyon Mine. The lower production of silver was owing to the same factors that caused a similar reduction in gold.

Magnesium.—Magnesium metal was the second-largest contributor to the value of base metals in 2003. Magnesium metal was produced from Great Salt Lake brines by U.S. Magnesium, LLC (formerly Magnesium Corp. of America, or Magcorp) at its electrolytic plant, which was in Rowley in Tooele County. U.S. Magnesium purchased the assets of Magcorp in June 2002 from the U.S. Bankruptcy Court. It was the only active primary magnesium processing facility in the United States. Magnesium production was less than capacity (which was rated at 43,000 t of magnesium metal) in 2003 owing to depressed magnesium prices and modernization of the processing plant.

Molybdenum.—The sole molybdenum producer in Utah was Kennecott's Bingham Canyon Mine, which produced more than 7,300 t of byproduct molybdenum concentrate (MoS_2) in 2003, which was a decrease of more than 20% compared with the amount produced in 2002. Production was lower owing to a combination of lesser amounts of molybdenum in the copper ore and decreased smelter throughput. The dollar value of MoS_2, however, did not decrease nearly as much because of the increased price per pound for concentrate (Magyar, 2004). The Bingham Canyon Mine was one of seven molybdenum-producing mines in the United States in 2003.

Environmental Issues

Several ongoing environmental issues in Utah were still unresolved. These issues included a proposed nuclear waste storage site on the Goshute Indian Reservation, and a proposal to move or cap the Atlas uranium tailings pile near Moab. The latest proposal from International Uranium, Inc. for dealing with the Atlas uranium tailings was to slurry the tailings and transport them to the company's mill at Blanding to be processed as alternative feed for the contained uranium content.

In 2001, the U.S. Environmental Protection Agency (EPA) designated the area around Eureka as a Superfund site. Many lots in the town had been cleaned up and work continued on other less-contaminated lots and on the reclamation and capping of several mine dumps. In addition, work was scheduled to begin on the Mammoth town site, which was approximately 3 km south of Eureka. In other EPA activities, surface reclamation of the Monticello mill site was completed, but surface and groundwater monitoring was scheduled to continue.

The Utah Abandoned Mine Reclamation group continued work on San Juan County uranium mines and several metal mining districts in western Utah. In San Juan County, reclamation was completed in the Cottonwood Creek area and was in progress in the Montezuma Creek area. Inventory was completed for parts of the Ophir district and the Stateline district, and mine reclamation had begun in both areas.

Legislation and Government Programs

The Utah Legislature approved a measure that required surety for small mines (less than 2 ha disturbance) and any mechanized surface-disturbing exploration. DOGM was drafting specific regulations. This measure would bring the Utah requirements in line with the U.S. Bureau of Land Management rules that required bonding for all mines, regardless of their size.

Recent legislation expanded the regulatory powers of the existing mine inspection program that was administered by DOGM. The agency could now note violations, require remediation, and assess fines.

A Utah legislative committee (Impacts of Gravel Pit Task Force) was disbanded without any action to change regulations for sand and gravel operations. Under State statutes, aggregate operations were exempt from the requirements to file mine reclamation plans and secure bonds for reclamation.

During 2003, the UGS released the following maps and publications of mining and related interests: a 161-page bulletin on energy, mineral, and groundwater resources of Carbon and Emery Counties (Bulletin 132); a 303-page bulletin on the geology of Millard County (Bulletin 133); three 7.5-minute geologic maps that cover the Silver Reef mining district (M-187, M-191, M-196); four 7.5-minute geologic maps of central Utah (M-185, M-188, OFR-428, MP-03-2); four 7.5-minute geologic maps of the southern Oquirrh Mountains-Lake Mountains area (OFRs 402, 403, 415, 416); three CD-ROMs of previously published geologic maps of the Nephi, Salt Lake City, and Price 30° x 60° quadrangles (M-189DM, M-190DM, M-198DM); the Richfield 30° x 60° geologic map (M-195); and open-file progress reports for four 30° x 60° geologic maps [OFR 404 (San Rafael Desert map), OFR 422 (east half of Salina map), OFR 418 (east half of Provo map), OFR 414 (Vernal map)]. Publications of interest planned for release in 2004 included a statewide map of high-calcium limestone occurrences that shows mines, prospects, and analytical data; three statewide energy maps that show geothermal resources, uranium-vanadium districts (including mines and prospects), and oilfields, gasfields, and pipelines; a special study of Sevier Lake and its brine and evaporite resources; and a special study of available coal resources in the southern Emery coalfield.

Information on other publications could be found at the Utah Geological Survey (UGS) Web site at URL http://geology.utah.gov. The Web site also contains information on geologic hazards, oil and gas summaries, mineral collecting sites, educational resources for teachers, and online publications, which included survey notes and other topics related to the geology of Utah. The UGS also has an education outreach program that includes activities for school groups during Earth Science Week, teacher workshops and field trips, UGS-prepared curriculum material on earth processes and geologic hazards, and geologic slides and educational kits for loan. Four kits were available: dinosaur; earthquake, Ice Age, and rock, mineral, and fossil kits.

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN UTAH[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		2001		2002		2003[p]	
		Quantity	Value	Quantity	Value	Quantity	Value
Beryllium concentrates	metric tons	2,480	3	1,970	2	2,500	3
Clays:							
Bentonite		51	W	W	W	W	W
Common		360	5,490	349	5,010	349	5,010
Gemstones		NA	1,020	NA	230	NA	233
Salt		2,300	121,000	2,090	113,000	2,200	112,000
Sand and gravel, construction		28,400	109,000	27,600	104,000	26,500	101,000
Stone, crushed		8,430	40,500	7,640	38,100	8,000	40,000
Combined values of cement (portland), copper, gold, gypsum (crude), helium (Grade-A), lime, magnesium compounds, magnesium metal, molybdenum concentrates, perlite (crude), phosphate rock, potash, silver, stone (dimension sandstone), and values indicated by symbol W		XX	1,090,000	XX	980,000	XX	1,010,000
Total		XX	1,360,000	XX	1,240,000	XX	1,260,000

[p]Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
UTAH: CRUSHED STONE SOLD OR USED, BY KIND[1]

	2001				2002			
Kind	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone[2]	15	5,260	$26,100	$4.97	12	4,510	$24,800	$5.50
Dolomite	3	2,200	7,870 [r]	3.58	3	2,080	7,450	3.59
Sandstone and quartzite	5	W	W	6.21	5	W	W	3.52
Volcanic cinder and scoria	3	W	W	9.28	3	W	W	5.22
Miscellaneous stone	7	282	2,190	7.78	7	283	2,270	8.03
Total or average	XX	8,430	40,500	4.81	XX	7,640	38,100	4.99

[r]Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.
[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes limestone-dolomite reported with no distinction between the two.

TABLE 3

UTAH: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	W	W	$8.21
Other coarse aggregate	W	W	6.15
Total or average	9	$75	8.34
Coarse aggregate, graded, bituminous aggregate, coarse	(2)	(2)	4.63
Fine aggregate (-3/8 inch), screening, undesignated	19	91	4.78
Coarse and fine aggregates:			
Graded road base or subbase	W	W	4.74
Crusher run or fill or waste	W	W	5.79
Other coarse and fine aggregates	25	139	5.56
Total or average	55	305	5.55
Other construction materials	7	63	9.00
Agricultural:			
Agricultural limestone	W	W	5.43
Poultry grit and mineral food	W	W	29.64
Other agricutural uses	2	9	4.50
Total or average	13	282	21.69
Chemical and metallurgical:			
Cement manufacture	W	W	6.59
Lime manufacture	W	W	4.59
Flux stone	W	W	5.29
Sulfur oxide removal	W	W	10.85
Total or average	3,660	22,000	6.02
Other miscellaneous uses and other specified uses not listed	6	35	5.83
Unspecified:[3]			
Reported	2,350	8,680	3.70
Estimated	1,500	6,600	4.32
Total or average	3,840	15,100	3.93
Grand total or average	7,640	38,100	4.99

W Withheld to avoid disclosing company proprietary data; included in "Total."

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Withheld to avoid disclosing company proprietary data; included in "Unspecified: Reported."

[3]Reported and estimated production without a breakdown by end use.

TABLE 4

UTAH: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1 1/2 inch)[2]	--	--	--	--	W	W	--	--
Coarse aggregate, graded[3]	--	--	(4)	(4)	--	--	--	--
Fine aggregate (-3/8 inch)[5]	W	W	W	W	W	W	--	--
Coarse and fine aggregate[6]	--	--	W	W	W	W	--	--
Other construction materials	--	--	7	63	--	--	--	--
Agricultural[7]	W	W	W	W	--	--	--	--
Chemical and metallurgical[8]	2,550	12,200	W	W	W	W	--	--
Other miscellaneous use	6	35	--	--	--	--	--	--
Unspecified:[9]								
Reported	487	2,000	1,840	6,550	16	106	4	29
Estimated	260	1,900	1,300	4,700	--	--	--	--
Total	3,330	16,400	4,230	21,100	76	640	4	29

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes riprap and jetty stone and other coarse aggregate.

[3]Includes bituminous aggregate (coarse).

[4]Withheld to avoid disclosing company proprietary data; included in "Unspecified: Reported."

[5]Includes screening (undesignated).

[6]Includes crusher run (select material or fill), graded road base or subbase, and other coarse and fine aggregates.

[7]Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

[8]Includes cement manufacture, flux stone, lime manufacture, and sulfur oxide removal.

[9]Reported and estimated production without a breakdown by end use.

TABLE 5

UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002, BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	1,590	$6,540	$4.12
Plaster and gunite sands	42	263	6.26
Asphaltic concrete aggregates and other bituminous mixtures	847	3,390	4.00
Road base and coverings[2]	3,310	12,300	14.51
Fill	1,660	3,770	2.27
Snow and ice control	37	128	3.46
Railroad ballast	104	577	5.55
Other miscellaneous uses	30	195	6.50
Unspecified:[3]			
Reported	9,480	36,200	3.82
Estimated	10,000	41,000	3.91
Total or average	27,600	104,000	3.79

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Includes road and other stabilization (cement and lime).

[3]Reported and estimated production without a breakdown by end use.

TABLE 6

UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)[2]	565	1,980	618	2,180	316	2,330
Asphaltic concrete aggregates and other bituminous mixtures[3]	W	W	W	W	345	2,000
Road base and coverings	696	2,150	1,120	4,070	1,310	5,410
Fill	154	367	1,130	2,420	246	664
Snow and ice control	W	W	9	47	W	W
Other miscellaneous uses[4]	421	1,180	161	675	80	495
Unspecified:[5]						
Reported	2,290	8,820	6,190	25,700	121	203
Estimated	2,300	8,800	6,400	23,000	1,900	8,900
Total	6,370	23,300	15,600	58,400	4,310	20,000

Use	Unspecified districts	
	Quantity	Value
Concrete aggregate (including concrete sand)[2]	130	318
Asphaltic concrete aggregates and other bituminous mixtures[3]	120	404
Road base and coverings	66	162
Fill	133	318
Snow and ice control	--	--
Other miscellaneous uses[4]	--	--
Unspecified:[5]		
Reported	886	1,460
Estimated	--	--
Total	1,340	2,670

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes plaster and gunite sands.

[3]Includes road and other stabilization (cement and lime).

[4]Includes railroad ballast.

[5]Reported and estimated production without a breakdown by end use.